



This manual describes the mechanical and electrical characteristics of "Pulse+Dir" for the MicroB Plus.

For any additional information that is not contained in this pamphlet (start-up, alarms, etc.), see the MicroB Plus service manual.

Index

-Introduction	Page 1
-Pulse+Dir Description	Page 2
-Signal Inputs and Outputs	Page 3
-Solder Point	Page 4-5
-Potentiometer adjustments	Page 6
-LED indicator	Page 6
-Speed adjustment with Pulse+Dir	Page 7
-Pulse+Dir connections	Page 8
-Examples of connections	Page 9
-Block Diagram	Page 10
-Example	Page 11
-Example of Master-Slave Application	Page 12

English*plus*
Pulse+Dir

Introduction

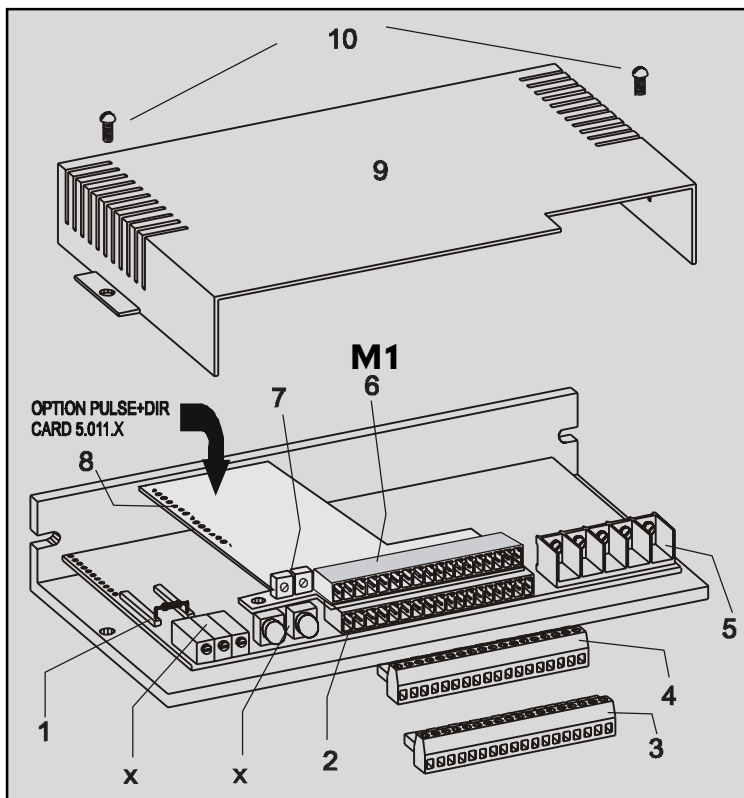
The Pulse + Direction board (5.011.x) is an optional board for the MicroB Plus servo amplifier. This board executed the speed and position regulation of a brushless servomotor utilizing a Pulse frequency signal + a Direction signal as a reference signal, comparing them with the Encoder frequency of the servo motor. The 5.011.x board has an internal digital integral/proportional converter, capable of accumulating a maximum error equal to a +/-11 bit. This board, applied to the basic MicroB Plus, can therefore be utilized in applications like an "electrical axis or master slave" .

The Pulse + Dir inputs and Encoder are the AM26LS33 differential line receiver type. These inputs can also be used in Common Mode.

Soldering points are internal for adjusting frequency between the Pulse input and Encoder. A protection is present internally for exceeding maximum internal integral value. The allarm is visualized when the drive is turned on by LED L1. The Drive OK output is available for external communication of said intervention. Also included are two regulation pots P1 (integral regulation) and P3 (PI gain regulation).

All trimmers present on the basic MicroB Plus are disabled when this optional board is present.

Microb Plus Pulse+Dir Description



- 1 Calibration Area
- 2 Basic Microb Plus Signal Terminals
- 6 M1 Phoenix Signal Terminals (Pulse + Dir input/output)
- 3-4 Extractable Phoenix Terminals.
- 5 Power Terminals AUGAT
- 7 Calibration potentiometers
- 8 5.011.x Card Solder point
- 9 Product Cover
- 10 Fixing screws
- X Not Enable

Technical Data

Encoder Interface	Line Receiver AM26LS33
Pulse + Dir Interface	Line Receiver AM26LS33
Pulse e Dir Frequency	Max. 200 KHz
Encoder Frequency	Max. 200 KHz
Freq. Encoder Adjustment	Divisible for (0.5, 1, 2, 4, 8, 16) FPulse

Signal input and output (connector M1)

1 (IN).	Encoder Input Channel CHA
2 (IN)	Encoder Input Channel /CHA
3 (IN)	Encoder Input Channel CHB
4 (IN)	Encoder Input Channel /CHB
5 (IN)	PULSE Input Frequency
6 (IN)	/PULSE Input Frequency
7 (IN)	DIR Input Frequency
8 (IN)	/DIR Input Frequency
9 (IN)	0P External ground
10(IN)	K1 Input
11(IN)	K2 Input
12(IN)	K3 Input
13(IN)	K4 Input
14(IN)	K5 Input
15(IN)	K6 Input
16(OUT)	DR. OK Output Normally High(max.5mA)
17(IN)	+Vext Power supply (Optional)
18(IN)	Drive Commond Ground GND

NOTE:--It is not necessary to connect anything to inputs 10-11-12-13-14 and 15. These functions are available through soldering points S5-S6-S7 and S8.

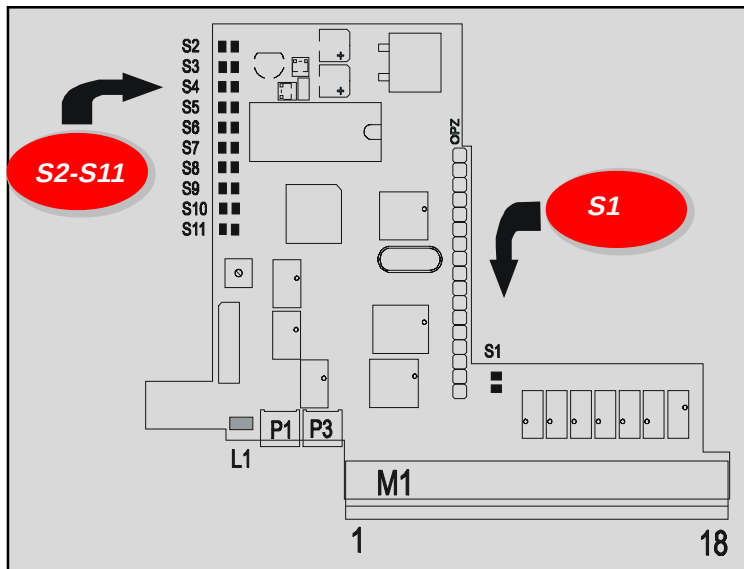
--With soldering point S1 closed input connectors pin 9 (0P) and pin 18 (0S) are connected together.

--With soldering point S2 closed, nothing is required to be connected to input 17. See Block Diagram page 10.

--With soldering point S9 closed is enabled the function PULSE + DIR input. With soldering S9 open is enabled the MASTER ENCODER (cha, chb) in the pulse + dir inputs.

Solder Point

11 Solder Point located on the left hand side of the 5.011.x card are used to change internal and external functions on the Option Pulse+Dir. Below are the descriptions of each solder bridge functions. Verify the corresponding solder bridge closings required by this Option.



S1 Connection external 0P with common ground 0S.

S1 Close = Common ground 0S (pin 18), and external common ground 0P (pin 9) are connected together. See block diagram page 10.

S1 Open = 0S and 0P are separate.

Note: This card is factory set with the solder bridge S1 Close.

S2 Power supply for the internal opto "DR.OK"

S2 Open = The internal opto DR.OK must be supply by input 17 +VExt.

S2 Close = The opto DR.OK is supply by internal power supply +5V.

See block diagram page 10.

Note: This card is factory set with the solder bridge S2 Close.

S3 Alarm Enable, for loss positioning

--S3 Open = At internal alarm intervention, for incorrect positioning, the L1 led is not on. It is not communicated externally through the DR.OK terminal 16 . Logic level output is High.

--S3 Closed = At internal alarm intervention, for incorrect positioning, the L1 led is LIT. The output DR.OK converts from logic level High to logic level Low (Max. 5mA). See Led indicator, page 6.

S4 Normally Closed (Don't touch)**S5-S6-S7-S8** Adjustement Encoder Frequency.

S5, S6, S7, S8 Closed Encoder Frequency is.... $F \text{ Pulse} / 0.5$

S5, S6, S8 Closed - S7 Open Encoder Frequency is.... $F \text{ Pulse} / 1$

S5, S6, S7 Closed - S8 Open Encoder Frequency is.... $F \text{ Pulse} / 2$

S5, S6, Closed - S7, S8 Open Encoder Frequency is.... $F \text{ Pulse} / 4$

S5, Closed - S6, S7, S8 Open Encoder Frequency is.... $F \text{ Pulse} / 8$

S5, S6, S7, S8 Open Encoder Frequency is.... $F \text{ Pulse} / 16$

Example: PULSE input frequency=50 Khz Solder Point S5,S6,S7 closed S8 Open.

$$\text{Freq. Enc} = \frac{50}{2} = 25\text{Khz}$$

Therefore with soldering points as in example, the encoder frequency will be equal to 25Khz, with a driving frequency (Pulse) of 50Khz.
Calculation of motor velocity attained.

$$\text{RPM} = \frac{\text{Freq. Enc} \times 60}{\text{PPR}}$$

With Freq. Enc=25Khz PPR encoder=2000 PPM/Rev

$$\text{RPM} = \frac{25000 \times 60}{2000} = 750$$

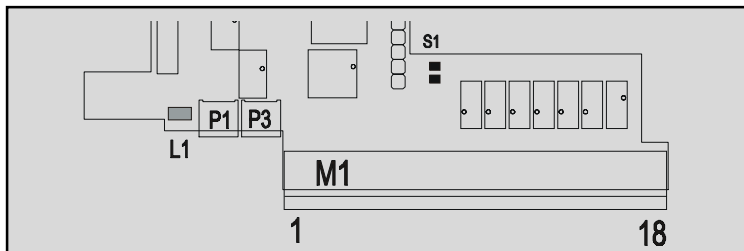
The motor having an encoder with 2000 imp/rev, with soldering points as in the example, will achieve a velocity equal to 750 rpm, with an input frequency (Pulse) of 50Khz.

S9 Selection of PULSE + DIR or MASTER ENCODER function.

With soldering point S9 closed is enabled the function PULSE + DIR input.
With soldering S9 open is enabled the MASTER ENCODER (cha, chb) in the pulse + dir inputs.(Example to page 12)

S10-S11 Internal setting. Don't touch

Potentiometer Adjustements



P1

Integral Gain potentiometer.

With a Anticlockwise sense (ccw), we increase the gain of the integral gain.

P3

Gain potentiometer. Use this potentiometer to increase or decrease the dynamic behavior of the motor

With a Anticlockwise sense (ccw) we increase the gain of the "digital integral/Proportional", therefore, improving the response. See block diagram page 10.

All trimmers present on the basic MicroB Plus are disabled when this optional board is present.

LED Indicator

L1 (RED) Normally OFF. This indicator is Lit for exceeding maximum internal integral value. The allarm is visualized when the drive is turned on by LED L1.

The Drive OK output (Pin 16), is available for external communication of said intervention. (Max value +/-11 Bit).

Irreversible Protection Intervention:

The drive is not reset/restarted. The power supply must be removed and the cause of intervention eliminated, then the power supply can be replaced. *Note: A mininum amount of time must pass in order to ensure that the drive is completely off prior to replacing the power supply.

Speed adjustment With Pulse+Dir

This Card 5.011.x "Pulse +Dir" is factory set with the following solder bridge configuration: S5, S6, S7 and S8 CLOSED.

In this configuration the encoder frequency is equal: $F_{\text{pulse}} / 0,5$

The other value "K" may be /1 /2 /4 /8 /16. See page 5.

Example: Frequency PULSE calculations in standard configuration.

--Velocity required of the motor = 5000 RPM

--Encoder with 2048 PPR/REV(line count)

Calculate the Frequency Encoder:

$$\text{Freq. Enc} = \frac{5000 * 2048}{60} = 170666 \text{ Hz}$$

Calculate the Frequency PULSE:

$$F_{\text{PULSE}} = \text{Freq. Enc} * K \text{ (Hz)}$$

Consequently:

$$F_{\text{PULSE}} = 170666 * 0.5 = 85333 \text{ Hz}$$

Where K in this case is 0,5

With F. PULSE equal to 85333Hz, the speed of the motor will be 5000 RPM. With F.PULSE equal to 8533 Hz, the speed of the motor will be 500 RPM.

Note:

The max. frequency for the PULSE+DIR and ENCODER inputs is 200Khz.

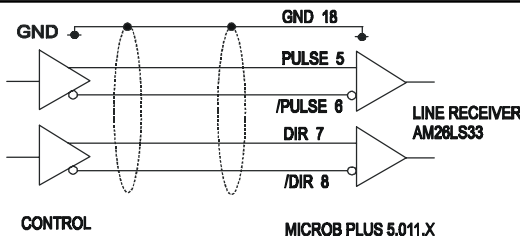
WARNING:

--Supply the Enable command (pin 7 basic connector), after the powering up the drive.

--The PULSE frequency input (pin 5 M1 connector), must be applied from control, after the Enable command.

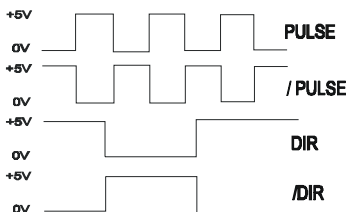
Pulse+Dir or Master Encoder input

Differential Input

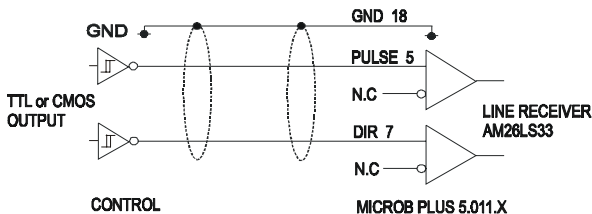


The following diagram shows an application utilizing a differential reference from PULSE +DIR.

The input level is from +5V to +14V. This signal cables must be shielded. For Master encoder connection see page 12.

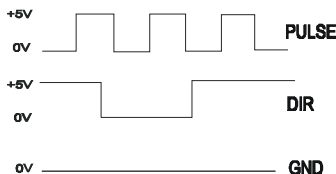


Common mode Input

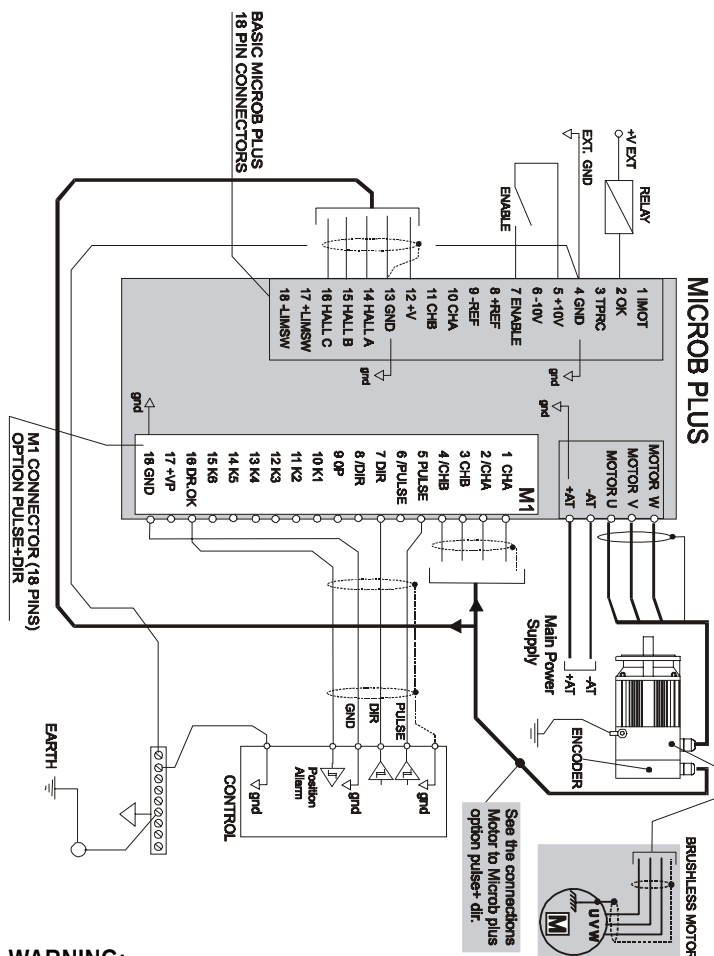


The following diagram shows an application utilizing a common mode reference from PULSE +DIR.

The input level is from +5V to +14V. This signal cables must be shielded.



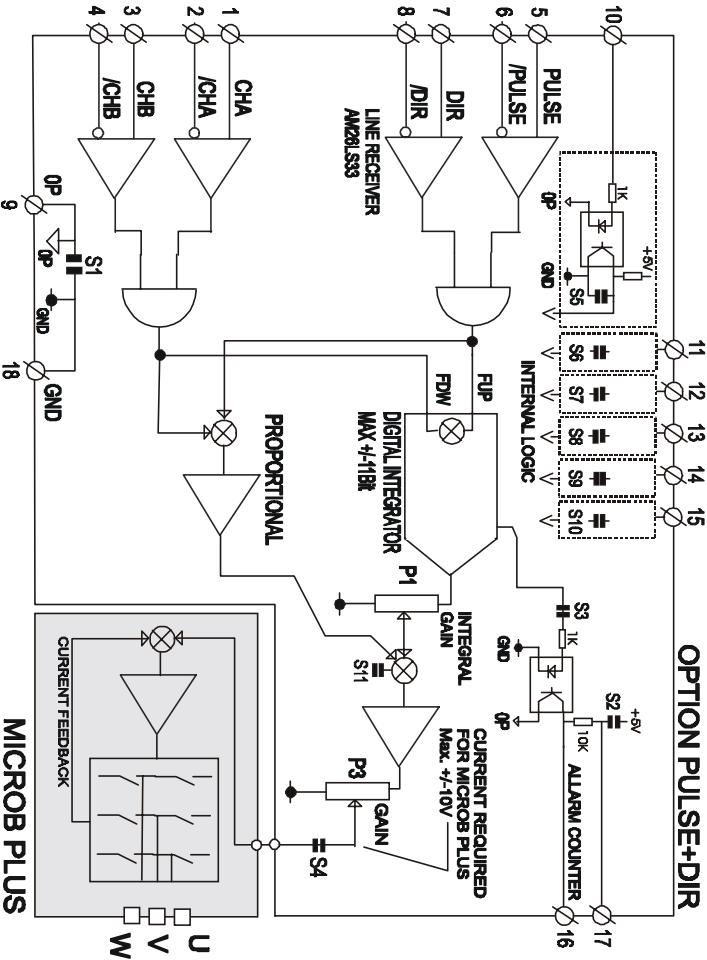
Example of Microb Plus Connection



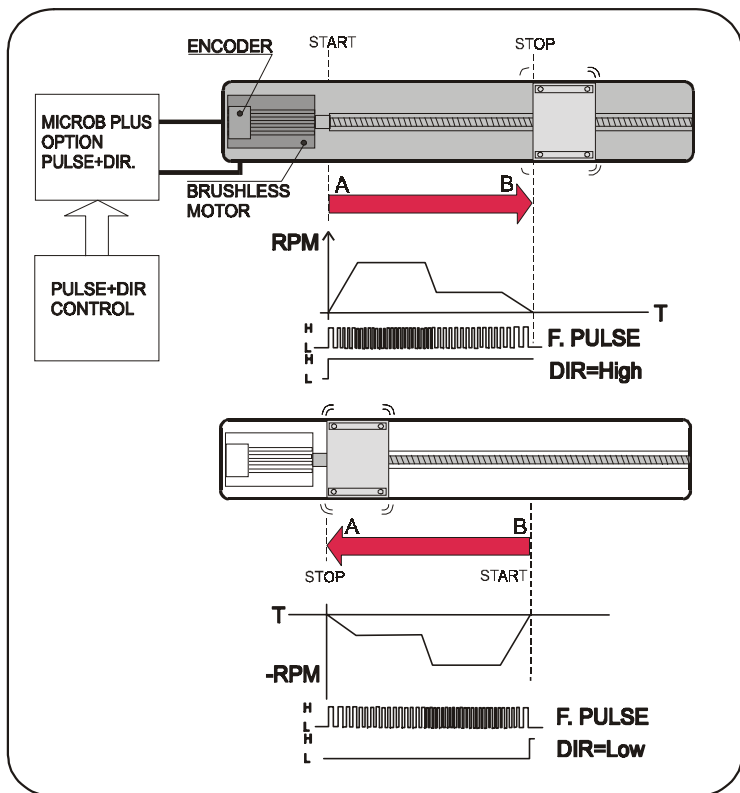
WARNING:

- Supply the Enable command (pin 7 basic connector), after the powering up the drive.
- The PULSE frequency input (pin 5 M1 connector), must be applied from control, after the Enable command.

Block Diagram

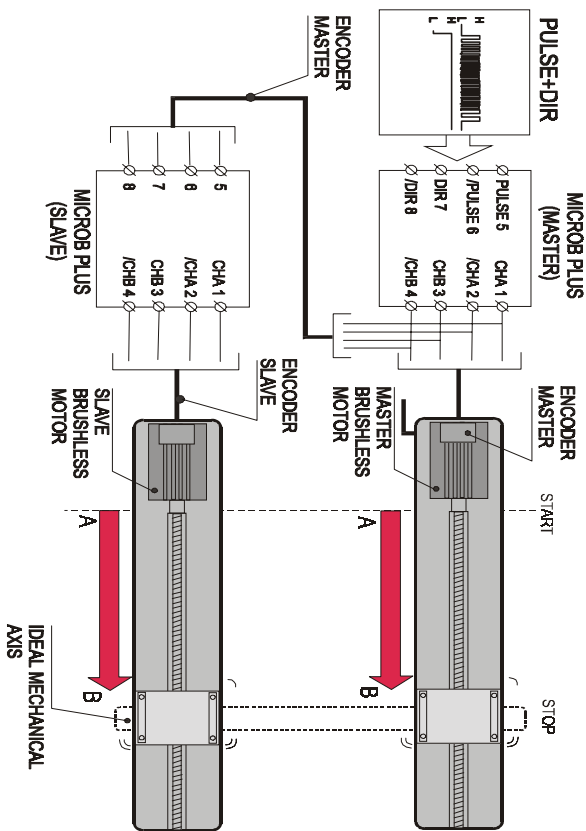


Example of function



The block diagram reported above, shows a typical application of Microb Plus with Pulse and Direction option. Applying a digital counting (Ex: 127039 plus the proper direction) to the signal input, the guide will move, from position A to position B, and it will stop in the required position. If we apply the same counting in Pulse input (inverting the direction signal), the guide will come back to initial position A. The modulation of such counting frequency, will determine the slope of acceleration motor ramp. The rate of applied max. frequency, will determine max. motor speed, and therefore the linear speed of the guide.

Example of Master-Slave Application



The block diagram reported above, shows a typical application of 2 Microb Plus with Pulse and Direction option. The Pulse+Dir counting is applied on product called MASTER; it will use the feedback from it's encoder. The SLAVE product works comparing as input frequency, the input of MASTER encoder, and as feedback the frequency of SLAVE encoder. Both mechanical guides, will move as electrical Axes. For This application, opening the soldering point S9, in the Microb Plus Slave.